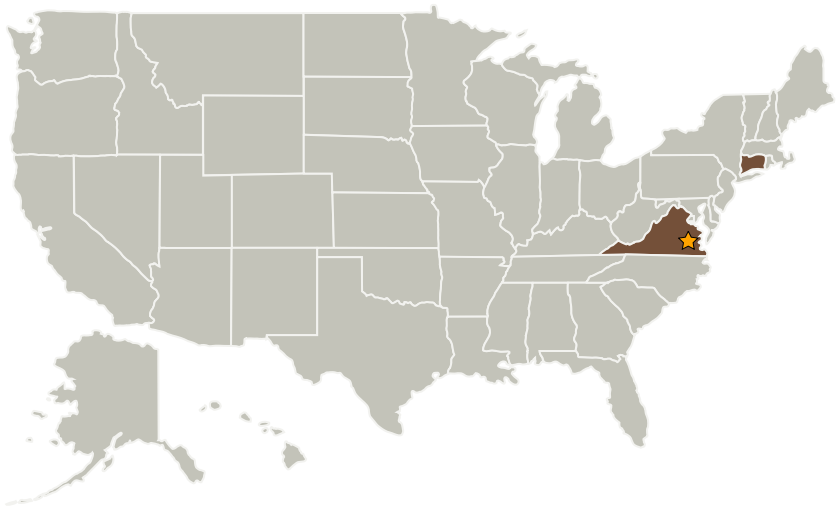
Radiation Shielding and Hydrogen Storage with Multifunctional Carbon, Phase I

Completed Technology Project (2005 - 2005)

Project Introduction

This project addresses two vital problems for long-term space travel activities: radiation shielding and hydrogen storage for power and propulsion. While both problems have been studied for many years, there is currently no satisfactory technology for providing adequate non-parasitic shielding. Even in low-Earth orbit, astronauts must be closely monitored for radiation exposure, and some missions simply cannot be performed due to the current inability to shield astronauts (e.g. Mars or surface Lunar bases). The overall objective of the proposed project is to construct, test, and deliver a prototype for hydrogen storage and radiation shielding. The Phase I objectives are to validate/verify the radiation shielding capability of these systems and to operate it in a relevant environment, i.e. while being bombarded by ionizing radiation at a nuclear accelerator. These objectives will be accomplished in four tasks: (1) prototype preparation and characterization; (2) empirical study of radiation shielding at BNL Accelerator Facilities; (3) complementary computational study to broaden shielding characterization and to validate shielding code performance with respect to this nonparasitic shielding concept and (4) process and product assessment. The successful operation of the prototype would raise the TRL from 4 to 5 or 6 (system operated in a relevant environment).

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
Advanced Fuel Research, Inc.	Supporting Organization	Industry	East Hartford, Connecticut

Primary U.S. Work Locations	
Connecticut	Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Eric Rubenstein

Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.5 Radiation
    - TX06.5.3 Protection Systems